

ARGUMENTS/REMARKS

In an office action dated March 13, 2007, claims 13-45 and 52-55 were rejected. The applicants respectfully traverse these rejections and, in conjunction with the following remarks, submit that the claims are allowable over the cited art.

The office action raises two issues. First, the office action alleges that various claims are anticipated by U.S. Patent No. 6,188,211 to Rincon-Mora. Second, the office action alleges that various claims are obvious in view of the Rincon-Mora reference in combination with U.S. Patent No. 6,166,850 to Roberts and U.S. Patent No. 5,477,858 to Norris.

Rejections under 35 U.S.C. § 102

Claims 13-32 stand rejected as being anticipated by the Rincon-Mora reference. Specifically, the office action states that “Rincon-Mora et al disclose the claimed subject matters a power regulator (figure 1 and 4), including a negative transient response (column 7, line 40-45), a positive transient response (column 9, line 1-9) and transient response (column 5, line 1-5, line 30-60 and column 7, line 45-50), a sense transistor (figure 1, item 28), a current source (figure 1, item 34).” The office action provides no further analysis or discussion supporting the rejections of claims 13-16, 21-23, 28-32.

No Disclosure of Two Transient Response Portions

To support a rejection under § 102, a prior art reference must disclose each and every element and limitation in the rejected claim. M.P.E.P. § 2131. Omission of any claimed element or limitation, no matter how insubstantial, is grounds for traversal.

The applicants’ claim 13 includes the following limitations: “a negative transient response portion configured to respond to fast transient negative current events...; and a positive transient response portion configured to respond to fast positive current events....” These limitations are not disclosed in the Rincon-Mora reference. The Rincon-Mora reference fails to disclose two transient response portions. In the Rincon-Mora reference, a single voltage regulator handles positive and negative transient responses through the exact same transistors (column 7 lines 40-43; column 8 lines 34-

36). In contrast, the applicants' claim 13 calls for a negative transient response portion and positive transient response portion. Consequently, all elements of claimed invention are neither disclosed nor implied by the Rincon-Mora reference.

The office action asserts that the Rincon-Mora reference discloses a negative transient response at column 7, lines 40-45, and a positive transient response at column 9, lines 1-9. Even if this characterization were accurate, the claim 13 requires a power regulator having negative transient response portion and a positive transient response portion. The claimed elements are physical circuit elements, not responses to signals, and these elements are absent from the Rincon-Mora reference. The cited portions of the Rincon-Mora reference do not refer to the claimed negative transient response portion and positive transient response portion. Instead, the cited portions refer only to positive and negative voltages and responses. The voltages are responses, not elements of a regulator, and do not constitute the claimed negative transient response portion and positive transient response portion.

No Disclosure of Positive and Negative Transient Response Portions with Sense Circuits and Reference Current Sources Coupled to Amplifiers

Claim 13 also includes the following limitations: "the negative transient response portion comprising a sense circuit and a first reference current source, each coupled to an amplifier for controlling a first output device; and a positive transient response portion comprising a sense circuit and a second reference current source, each coupled to an amplifier for controlling a second output device." These express elements of claim 13 are absent in the Rincon-Mora reference. The office action asserts that the Rincon-Mora reference discloses "a sense transistor (figure 1, item 28)" and "a current source (figure 1, item 34)". Claim 13 is not limited, however, to simply a sense transistor and a current source. Claim 13 requires two transient response portions, each including a sense circuit and a reference current source, each coupled to an amplifier for controlling an output device. The office action fails to identify two transient response portions in the Rincon-Mora reference, as well as where the claimed sense transistors and current sources are

coupled to amplifiers to control output devices as claimed. Consequently, the office action fails to fulfill the prima facie requirements to support the rejections.

No Disclosure of the Reference Current Source Connected to Amplifier

Moreover, the current source identified by the office action in the Rincon-Mora reference does not comprise a reference current source coupled to an amplifier as claimed. Instead, the Rincon-Mora reference discloses a current source 34 used to minimize the quiescent current of a NMOS transistor (column 4 lines 60-63). A reference current source may be used by an amplifier to produce an output that is related to the difference between what the load current should be and what the sensed current from the load actually is. This is a very different process than that described in the Rincon-Mora reference with respect to the current source 34, which is used simply to lower the no-load current consumption of the circuit (column 4 lines 60-65). The current source 34 is nowhere described as coupled as a reference current source, but rather is described as coupled to ground and to transistors 24, 35, 28 (column 4 lines 55-58; abstract). The abstract of the Rincon-Mora reference details this connection: "a first feedback transistor (28) and a second feedback transistor (35) which are connected to the source of the source follower transistor (24) and in parallel with a weak current source (34)". The current source 34 is not coupled to an amplifier and does not perform as a reference current source. Accordingly, the current source 34 cannot be properly likened to a reference current source that is coupled to an amplifier as claimed.

No Disclosure of First and Second Reference Current Sources

Furthermore, the Rincon-Mora reference fails to disclose a second reference current source coupled to an amplifier. The Rincon-Mora reference discloses a single current source 34, used for lowering quiescent current, but does not disclose a second reference current source that is coupled to an amplifier (column 4 lines 60-65). Even if current source 34 cited in the office action were a reference current source coupled to an amplifier, the Rincon-Mora reference does not disclose a second reference current source coupled to an amplifier. Thus, the Rincon Mora reference fails to disclose the reference

current sources as claimed. Accordingly, the rejections of claim 13 and its dependent claims are improper and should be withdrawn.

No Disclosure of Amplifier Controlling an Output Device

Claim 13 also requires “an amplifier for controlling a first output device” and “an amplifier for controlling a second output device”. The office action provides no indication of where these elements are disclosed in the Rincon-Mora reference, and the cited portions of the Rincon-Mora reference fail to disclose the claimed elements and limitations. Consequently, the office action fails to fulfill the prima facie requirements to support the rejections.

No Disclosure of Output Devices Responding Faster than the Operating Bandwidth of the Amplifier

Claim 13 requires that the “output devices respond to transient events faster than the operating bandwidth of the amplifier”. The office action provides no indication as to where this limitation is disclosed in the Rincon-Mora reference, and the cited portions of the Rincon-Mora reference fail to disclose the claimed elements and limitations. Consequently, the office action fails to fulfill the prima facie requirements to support the rejections.

Dependent Claims

The rejections of the dependent claims are likewise unsupported. For example, with regard to claims 17-20 and 24-28, the office action indicates that ““utilization of bipolar transistor or MOS transistor is an obvious design choice”. This is not a proper rejection under § 102(e), and the obviousness rejections are discussed below.

To reject claim 32, the office action merely notes “column 8, lines 65-70”. Claim 32 requires the power regulator to be configured to respond to transient events that occur at a rate greater than about 10 MHz, and the primary voltage regulator is configured to respond to transient events less than about 10 MHz. The cited portion of the Rincon-Mora reference relates to the gain of an error amplifier and a unity gain frequency of

about 1 MHz., and discusses a simulation of voltage regulator results. The cited section does not have any apparent relation to the limitations of claim 32, and the rejection should be withdrawn.

No reasons are cited for rejecting any of the remaining dependent claims 14-16, 21-23, and 29-31. These claims, however, include several limitations that are not disclosed in the Rincon-Mora reference, and the office action provides no grounds to support the rejections. For example:

- Claim 14: “the negative transient response portion comprises an output transistor configured to be in an on state when power is supplied to the negative transient response portion.”
- Claim 15: “the sense circuit in the negative transient response portion comprises a sense transistor coupled to the first reference current source and the output transistor, wherein quiescent current of the output transistor is less than the current supplied by the output transistor in response to a transient power demand.”
- Claim 16: “the amplifier in the negative transient response portion is coupled in series between the current source and the sense transistor.”
- Claim 21: “the output device in the positive transient response portion comprises an output transistor configured to be in an on state when power is supplied to the positive transient response portion.”
- Claim 22: “the sense circuit in the positive transient response portion comprises a sense transistor coupled to a the second reference current source and the output transistor, wherein quiescent current of the output transistor is less than the current supplied by the output transistor in response to a transient power demand.
- Claim 23: “the amplifier in the positive transient response portion is coupled in series between the current source and the sense transistor, wherein the output transistor responds to transient events that are faster than the operating bandwidth of the amplifier.”

- Claim 29: “the second reference current source comprises a resistor and a voltage source”.
- Claim 30: “A power regulation system comprising the power regulator of claim 13.”
- Claim 31: “a primary voltage regulator coupled in series to the power regulator, wherein the primary voltage regulator is configured to supply power to a load and respond to slow transient events, and wherein the power regulator is configured to respond to fast transient events.”

In sum, each of the claims rejected under §102 includes limitations that are wholly absent from the Rincon-Mora reference, and the applicants respectfully submit that the rejections should be withdrawn. If the rejections based on the Rincon-Mora reference are to be maintained, the applicants respectfully request identification of the particular portions of the Rincon-Mora reference that are alleged to disclose these elements and limitations to facilitate development of these issues.

Rejections under 35 U.S.C. § 103

In light of the recent Supreme Court decision in *KSR v. Teleflex*, and the recent decisions by the Board of Patent Appeals and Interferences in *Ex Parte Smith*, *Ex Parte Kubin*, and *Ex Parte Catan*, any obviousness determination must be consistent with the traditional *Graham* factors. Thus, obviousness is determined according to (1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the prior art and the claimed invention, and (4) the extent of any objective indicia of nonobviousness.

In addition, the examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference

or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP 2142. In addition, the pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified. 37 C.F.R. § 1.104(c)(2). In the present case, the office action fails to fulfill several of these criteria with respect to the various claims.

The office action alleges that claims 33-45 and 52-55 are unpatentable over the Rincon-Mora reference in view of the Roberts and Norris references. Specifically, the office action states: “Rincon-Mora et al disclose the claimed subject matters as explained in claims 1-32, above, except the utilization of the technique for a slow transient response and fast transient response and an amplifier including a transconductance stage, boost circuit, and sense circuit. However, Roberts et al teaches the utilization of similar technique for a slow transient response and fast transient response ... and Norris et al teaches the utilization of technique for an amplifier including a transconductance stage, a boost circuit, and sense circuit”

Failure to Disclose All Claim Limitations

The applicants note that claims 33-45 and 52-54 do not depend from claims 1-32, and the significance of the office action’s statement that “Rincon-Mora et al disclose the claimed subject matters as explained in claims 1-32” is not clear. Although this position may be relevant to claims 1-32, because claims 33-45 and 52-54 do not depend from claims 1-32, the assertion is irrelevant. To support the rejections, the cited references must disclose the limitations of claims 33-45 and 52-55, not claims 1-32. Further, even to the extent that this statement is somehow significant, as described above, the Rincon-Mora reference fails to disclose several elements and limitations of claims 13-32.

In addition, the prior art references when combined still must teach or suggest all of the claim limitations. MPEP 2143. The Rincon-Mora reference fails to disclose various elements and limitations of independent claims 33 and 52. For example, claim 33 calls for a first voltage regulator configured to respond to slow transient demands, and a second voltage regulator comprising a sense amplifier, a current source and a current

sink, configured to respond to fast transient power demands. Claim 52 calls for, in part, a regulator comprising an amplifier including a transconductance stage and an output stage, a compensation capacitor coupled to the output of the transconductance stage, a sense circuit including a threshold voltage reference and a comparator coupled to the threshold voltage reference. The sense circuit is coupled to the input of the transconductance stage of the amplifier and is further coupled to a reference voltage source. A boost circuit is coupled to the sense circuit. The boost circuit includes a first switch coupled to a boost capacitor and further coupled to a voltage source, and a second switch coupled to the boost capacitor and the input of the output stage of the amplifier.

None of these elements can be found in the cited references in the manner specified in claims 33 and 52. The office action cites no portion of the Rincon-Mora reference disclosing various elements of claims 33 and 52 and their respective dependent claims. The Rincon-Mora reference does not disclose the first and second voltage regulators, and does not disclose the second voltage regulator comprising a sense amplifier, a current source and a current sink. The Rincon-Mora reference does not disclose a first voltage regulator configured to respond to slow transient demands, and a second voltage regulator configured to respond to fast transient power demands. The Rincon-Mora reference only discloses a single voltage regulator 10 with a single voltage output (column 3 lines 11-14). The Rincon-Mora reference does not disclose any of the other expressly claimed features of claims 33-45.

Similarly, the Rincon-Mora reference fails to disclose several elements of claims 52-55. For example, the Rincon-Mora reference does not disclose an amplifier including a transconductance stage and an output stage; it does not disclose a compensation capacitor coupled to the output of the transconductance stage; it does not disclose a sense circuit coupled to the input of the transconductance stage of the amplifier and coupled to a reference voltage source; it does not disclose a boost circuit is coupled to the sense circuit, much less a boost circuit including a first switch coupled to a boost capacitor and further coupled to a voltage source, and a second switch coupled to the boost capacitor and the input of the output stage of the amplifier.

Acknowledging that the Rincon-Mora reference does not disclose a first voltage regulator configured to respond to slow transient demands and a second voltage regulator configured to respond to fast transient power demands, the office action relies on the Roberts reference, asserting that the Roberts reference discloses a “similar technique for a slow transient response and fast transient response (column 6, line 60-70 and column 7, line 1-25). Regardless of the accuracy of this statement, it is not adequate to support the rejections. The prior art references when combined still must teach or suggest all the claim limitations, and the claims call for a specific structure and limitations, not a “similar technique”. Furthermore, the Roberts reference does not disclose a first voltage regulator configured to supply power to a load and to respond to slow transient power demands or a second voltage regulator coupled to the first voltage regulator configured to respond to fast transient power demands, but only discloses a single element which can respond only to sudden transient demands (column 6 lines 60-65). The Roberts reference only discloses a single voltage regulator that responds to sudden transient demands, and does not disclose two voltage regulators responding to slow and fast transient power demands, respectively. Thus, the Roberts reference does not disclose any of the requirements specified in claim 33.

The office action further recognizes that the Rincon-Mora reference fails to disclose an amplifier including a transconductance stage, a sense circuit, and a boost circuit coupled to the sense circuit. The office action apparently rejects claims 52-54 based on the combination of the Rincon-Mora and Norris references, asserting that “Norris et al. teaches the utilization of technique for an amplifier including a transconductance stage, a boost circuit, and a sense circuit (figure 10C, item 2006 and 2124)”. Even assuming that this characterization is correct, it does not support the rejections of claims 52-54. Claims 52-54 include several limitations absent from the cited references, none of which are addressed by the office action, including (1) an amplifier with a transconductance stage and a compensation capacitor coupled to the output of the transconductance stage of the amplifier; (2) a sense circuit coupled to the input of the transconductance stage of the amplifier and further coupled to a reference voltage source; (3) a boost circuit coupled to the sense circuit; and (4) the boost circuit

including a first switch coupled to a boost capacitor and further coupled to a voltage source, and a second switch coupled to the boost capacitor and the input stage of the output stage of the amplifier. None of the elements taken alone or in combination can be found within the cited references in the manner specified in claim 52.

Moreover, the characterization of the Norris reference is inaccurate. The Norris reference does not disclose an amplifier including a transconductance stage and an output stage, but instead a transistor with high transconductance characteristics (Fig. 10C1, ref. 21; col. 87, lines 62-64). The Norris reference may disclose a compensation capacitor, but the capacitor is not coupled to the output of a transconductance stage of the transistor. Instead, the capacitor is coupled to the input of a transistor that has high transconductance characteristics. Merely using the word “transconductance” in the Norris reference does not disclose the elements and limitations of claims 52-54.

In sum, the office action fails to identify several express elements and limitations of the claims in the Rincon-Mora, Roberts, and Norris references. To support the rejections, the prior art references when combined still must teach or suggest all the claim limitations. Consequently, the rejections of the claims are improper and should be withdrawn.

No Suggestion or Motivation to Modify or Combine References

It is inappropriate to reject claims based on obviousness without an objective reason to combine the teachings of the references. “[T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” KSR, slip op. at 14. Further, “a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” KSR at 14. It is important for the office action “to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” KSR at 15. An examiner must present a “convincing line of reasoning supporting a rejection.” MPEP 2144.

In the present case, the office action fails to provide the required articulated reasoning with a rational underpinning. The office action asserts that the claimed invention would be obvious “for the purpose of enabling/disabling of a control system by operation of a transient magnitude threshold sensor”. The applicants respectfully submit that this does not constitute “articulated reasoning with a rational underpinning”. The applicants further respectfully submit that this position is unclear, and if the rejections are to be maintained, request further explanation to clarify the reasoning.

In addition, the cited references provide no motivation for their modification or combination. For example, comparing the nature of the problem to be solved in the Rincon-Mora reference with that in the Roberts and the Norris references, the references solve substantially unrelated problems. The Rincon-Mora reference is concerned with developing a voltage regulator with low quiescent current especially in low load conditions (column 2 lines 18-21). The Roberts reference relates to the development of a system to regulate the gain of an optical waveguide amplifier (column 3 lines 21, 25-26). The Norris reference discusses an ultrasound imaging system using Doppler signal processing (column 3 lines 1-4). None of these identified problems are related.

No Reasonable Expectation of Success

The office action must describe a reasonable expectation of success in modifying or combining the cited references to achieve the claimed invention. The level of predictability need not be absolute, but a showing of at least some degree of predictability is required. MPEP 2143.02. The office action does not address this element of the *prima facie* case. Since this element is unaddressed, the rejections are improper and should be withdrawn.

Dependent Claims

Inasmuch as claims 34-45 and 53-55 depend from independent claims 33 and 52, respectively, the applicants submit that such dependent claims are patentable over the cited references. Further, the dependent claims include additional limitations which are

disclosed neither explicitly nor implicitly within the cited references. The applicants additionally request withdrawal of the rejections of these claims.

Functional Language is Acceptable and Must be Considered

In various instances, the office action appears to disregard the language following the words “configured to” in the claims as functional language that does not aid in differentiating the claimed apparatus from the subject matter disclosed in the references. The applicant respectfully traverses this position. Under the MPEP 2173.01, a claim may not be rejected solely because of the type of language used to define the subject matter for which patent protection is sought. Further, a functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971). A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used.¹

Improper Hindsight

The applicants submit that, in view of the shortcomings of the cited references, the conclusions of the office action can only be reached through the impermissible use of hindsight. The claimed invention is not simply a “predictable use of prior art elements according to their established functions,” and the office action provides no objective reason to combine their respective teachings to arrive at the claimed invention. “A factfinder should be aware ... of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” KSR at 17.

¹ *In re Land*, 368 F.2d 866; *In re Ludtke*, 441 F.2d 660; *In re Atwood*, 354 F.2d 365; *Ex parte Sherman*, 45 USPQ 532; *Intel v. US ITC*, 946 F.2d 821.

In the present case, the office action relies on the applicants' disclosure and/or hindsight to support the obviousness rejection. This is clearly inappropriate, as "the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure." MPEP 2143. Because the office action cannot support the rejections without relying on the applicants' disclosure and/or hindsight, the rejections are improper and should be withdrawn.

CONCLUSION

In sum, the applicants respectfully submit that all claims are patentable over the cited references and are in condition for allowance. If there are any questions or concerns, please contact the undersigned at the telephone number indicated below.

Date: 13 SEP 07



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